



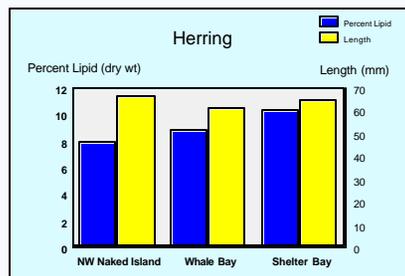
# Spatial and Temporal Variation in the Lipid Content of Juvenile Herring and Sand Lance

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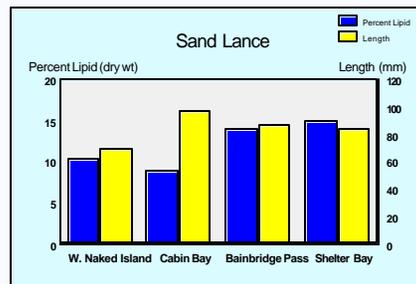
EVOS Restoration Project 347

## Spatial Variation in Lipid Content

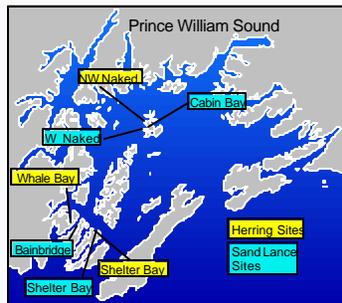
Newly recruited herring and sand lance were collected from locations in Prince William Sound (PWS) during a 2 week period in July/Aug 1997 to determine if fish from the sites differed in lipid content. Comparisons of lipid content were made with one-way ANCOVA with length as the covariate & location as the factor.



Lengths of the herring did not vary among locations, but lipid content was higher among herring collected from southwestern PWS.



Length and lipid content of sand lance varied among locations. Like the herring, fish from southwestern PWS had the highest lipid content.

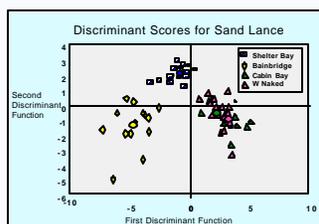


## Summary

- Spatial variation in lipid content among recruiting sand lance & herring can be detected as early as July/Aug & was highest in southwestern PWS.
- Spatial variation in fatty acids was consistent with variation in lipid content, suggesting differences in lipid content relate to differences in prey availability.
- Development of lipid phenologies can provide valuable insight into mechanisms influencing recruitment in forage fish populations.

## Spatial Variation in Fatty Acid Composition

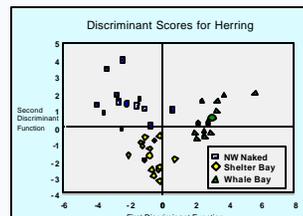
We evaluated the fatty acid (FA) composition of the triacylglycerols (TAGs) to determine if variation in lipid content was consistent with differences in FAs. TAGs are the primary lipid depot in these species & FAs acquired in the diet are transferred to these depots with little or no modification. Therefore, differences in the FAs of the TAGs should reflect differences in diet.



SandLance



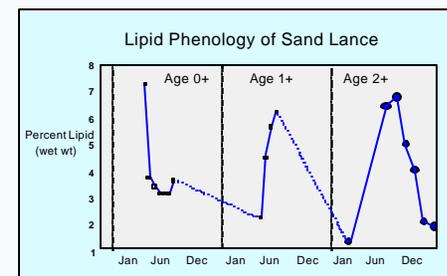
Herring



Fatty acids comprising TAGs varied spatially in both species ( $P < 0.001$ ). The leave-one-out method, a jack-knifing procedure used to classify "unknowns" with the discriminant functions, correctly classified fish by location  $> 83\%$  of the time.

## Temporal Variation in Sand Lance Lipid Content

Age 0+ & 1+ sand lance, collected bi-weekly from Kachemak Bay in 1998, were examined to identify seasonal variation in lipid content. Our data (squares) combined with those reported by Robards et al. (1999) (circles) were used to develop the model below which describes the lipid phenology of sand lance.



Age 0+s lost lipid from May until metamorphosis in July when they reached energetic minimum. Afterward levels slowly increased. In contrast, age 1+s had lowest lipid levels in May and increased their levels until early July. After July, age 2+ deplete lipid reserves, presumably to fuel gonad development (Robards et al. 1999).

Robards et al. 1999. J. Exp. Marine Biology and Ecology. 242:245-258.